FOREST PRODUCTS
Project Fact Sheet

THE REMOVAL OF WAX AND STICKIES FROM OCC

BENEFITS

- Improved competitiveness of the U.S. pulp and paper industry
- Greater use of the fiber obtained from recycled OCC
- Elimination of the dispersion/kneading step during repulping operations
- Reduced downtime of mill machinery
- Enhanced quality of remanufactured OCC
- Elimination of annual cost penalty to the industry of $600 million from the cumulative effects of wax and stickies

APPLICATIONS

The results of the mill trials will be used to simulate the flotation stage in an OCC system for eventual commercialization of the technology.

Greater Recycling of OCC Will Depend on Solving the "Wax and Stickies" Problem

The recycling of old corrugated containers (OCC) will become easier and save the paper industry $600 million annually when an effective method is available to remove wax and sticky contaminants during remanufacture of the containers. The demand for OCC requires that the percentage of containers that are recycled must rise 10 percent to a total of 75 percent. Removal of adhesives ("stickies") from labels and "Post-It" notes, and of glue, wax, tapes, and staples that are used in assembling the OCC will ensure high-quality fiber for the next generation of containers.

The screens and cleaners currently used in recycling mills are not very effective in removing these contaminants. While small quantities of wax can be tolerated in OCC systems, wax in fiber reduces interfiber bonding, hinders the adhesion of coatings, and impairs the appearance as well as the gluing and printing of the product. Stickies can deposit on components of the paper machine and interfere with its operation. They can also affect fiber bonding, sheet appearance, and printing and converting operations.

A new separation method is needed to handle the particle size, shape, and density of wax and stickies without incurring excessive fiber losses. A flotation deinking system appears to have the potential for removing wax and stickies if certain principles of surface chemistry and fluid dynamics are taken into account. The improvements to OCC feedstock will translate into a better appearing product, greater adhesion of coatings, enhanced fiber bonding, and fewer problems with operating the mill machinery.

OFFICE OF INDUSTRIAL TECHNOLOGIES
ENERGY EFFICIENCY AND RENEWABLE ENERGY • U.S. DEPARTMENT OF ENERGY

PROJECT DESCRIPTION

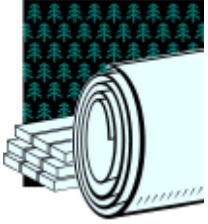
Goal: To develop methods for the effective removal of wax and stickies from OCC feedstock in order to enhance the competitiveness of the U.S. paper and board products industry in global markets.

Phase I and II of this two-year study took place in the laboratories of Voith Sulzer Paper Technology of Appleton, Wisconsin. The objective of the laboratory studies was to identify repulping conditions that promoted favorable flotation characteristics for wax and stickies, including temperature, pH, and the presence (or absence) of chemicals.

In Phase III, pilot trials will take place in the Voith Sulzer Paper Technology Pilot Plant. In Phase IV, mill trials will be conducted in a suitable industrial facility, during which a specific contaminated stream will be diverted through a flotation cell.

PROGRESS & MILESTONES

- Favorable results during the laboratory studies (Phase I and II) included quantification and characterization of wax in pulp, requiring the separation of wood fibers from each other, the release of contaminants from individual fibers, and the presence of appropriate particle sizes.
- Solvent extraction was selected as a reliable method for determining the weight of wax in fiber.
- A sedimentation-flotation method was developed to determine free and bound wax in a pulp sample, and can be used to predict the effectiveness of froth flotation in removing wax.
- Future work will focus on determining the pulping conditions that are conducive to removing wax, looking at such parameters as temperature, pH, and pulping time. Innovative methods will also be examined, including the use of enzymes, ultrasonics, solvent, and supercritical CO2 extraction.



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